

Harding Lawson Associates

A Report Prepared for

Van Waters & Rogers Inc.
6100 Carillon Point
Kirkland, Washington 98033

INITIAL GROUNDWATER SAMPLING REPORT
PRELIMINARY AFFECTED AREA
WATER SUPPLY ORDER
BOISE, IDAHO

HLA Project No. 10987 01

by

S. Michelle Watson
S. Michelle Watson
Senior Geologist

Cathleen A. Aviles
Cathleen A. Aviles
Staff Geophysicist

Christopher R. Smith
Christopher R. Smith, PG#736
Principal Hydrogeologist

Harding Lawson Associates
7655 Redwood Boulevard
P.O. Box 578
Novato, California 94948
415/892-0821

November 17, 1992

RECEIVED

NOV 20 1992

DIVISION OF
ENVIRONMENTAL QUALITY
SWIRO

USEPA SF



1415871

TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	BACKGROUND	2
2.1	Preliminary Affected Area	2
2.2	Well Survey	2
3.0	FIELD INVESTIGATION	4
3.1	Sampling Procedures	4
3.2	Analytical Program	5
4.0	RESULTS AND DISCUSSION	6
4.1	Groundwater Analysis	6
4.2	Quality Assurance/Quality Control	6
4.2.1	Field Quality Control	7
4.2.2	Laboratory Quality Control	8
4.2.2.1	Matrix Spike	8
4.2.2.2	Matrix Spike Duplicate	8
4.2.2.3	Blank Recoveries	8
4.2.3	Overall Completeness	8
4.3	Well Owner Data	9
5.0	RESAMPLING PLAN	10
6.0	SUPPLEMENTAL SAMPLING PLAN	11
7.0	REFERENCES	12

TABLE Quality Assurance Data Summary

PLATE Preliminary Affected Area

DISTRIBUTION

1.0 INTRODUCTION

Harding Lawson Associates (HLA) has prepared this Initial Sampling Report for Van Waters & Rogers Inc. (VW&R), Kirkland, Washington, to describe the initial sampling of private wells in and near the Preliminary Affected Area (PAA), Boise, Idaho (Plate 1). The scope of work and objective of this investigation were outlined in the *Initial Sampling Plan, Preliminary Affected Area, Water Supply Order, Boise, Idaho*, dated August 3, 1992 (HLA, 1992c). This Initial Groundwater Sampling Report has been prepared pursuant to the terms of the Water Supply Order effective January 3, 1992, and between the Idaho Department of Health and Welfare, Division of Environmental Quality (Department) and VW&R.

The objective of the initial sampling was to define the geographic area in which perchloroethylene (Perc) and its degradation compounds are present in groundwater in excess of their respective U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) adopted under the Safe Drinking Water Act. The area is generally downgradient (northwest) of the Pier 1 Imports store (Pier 1) at the Boise Towne Square Mall. Once this area within the PAA is identified, it will be known as the Affected Area.

The background and field investigation are discussed in Sections 2.0 and 3.0, respectively. Section 4.0 presents the results of the initial sampling, and Section 5.0 is the resampling plan. Section 6.0 lists the references cited in this report.

2.0 BACKGROUND

2.1 Preliminary Affected Area

The PAA, identified in the Water Supply Order, includes the area northwest of the Boise Towne Square Mall property. It is generally bordered by Five Mile and Hampton Roads to the west, Sunflower Lane, Fairview Avenue, and Irving Lane to the north, and the area between Emerald Street and the Union Pacific Railroad to the south (Plate 1).

Perc was detected in certain private wells in the PAA during the Department's private well sampling conducted in July 1988 and April 1989. Other environmental investigations have also been performed in the vicinity and were summarized in the Boise Towne Square Mall Supplemental Investigation Work Plan (HLA, 1992b). As the work described in the Water Supply Order and other activities progress, the PAA will be redefined as the Affected Area, and the boundaries on Plate 1 will be modified accordingly.

2.2 Well Survey

The objectives of the Water Supply Order are to (1) eliminate use of water supply wells which are affected by Perc, and (2) evaluate the need for, develop, and implement a procedure to provide alternative water supplies for households and other groundwater users in the PAA. The order provided the framework for a series of activities to be performed by the Department and VW&R to meet these objectives.

The first step was to identify the extent of groundwater affected by Perc. Between January and May 1992, the Department surveyed residents and property owners in the PAA to locate wells within the PAA and determine their uses and type of construction. VW&R and their consultant, D-M Information Systems, Inc. (DM),

developed a database of property-owner and survey information. The results were presented to the Department in a survey report prepared by VW&R and dated June 9, 1992 (VW&R, 1992).

A completion date for the Water Well Survey of May 20, 1992 was set by the Department to expedite providing alternative water to well owners. Several additional properties with wells were identified subsequent to May 20, but not included in the survey report. However, they were included in the Initial Sampling Plan dated August 3 (HLA, 1992c).

3.0 FIELD INVESTIGATION

The initial sampling of 28 private wells to evaluate groundwater chemistry in the PAA was conducted August 19 through 21, 1992. Prior to sampling, authorization had been obtained from the well owners. Sample collection, equipment decontamination, and other field activities were performed in accordance with the Initial Sampling Plan and Quality Assurance Project Plan (QAPP) and are described in the following sections (*HLA, 1992a,c*). Four wells proposed for sampling in the Initial Sampling Plan were not sampled because they were either abandoned or not able to be sampled. Other nearby wells were sampled to replace these four wells.

3.1 Sampling Procedures

The sampling methods were a function of well construction and access. In general, wells were purged with their installed pumps for a minimum of 5 minutes and until the pH, temperature, and conductivity readings stabilized. Wells without pumps were purged using a centrifugal pump. Samples were collected from the discharge line at the access point closest to each well or by using a stainless steel bailer. To minimize the potential for cross-contamination, all sampling equipment was decontaminated before sampling by washing with nonphosphate detergent and water and double rinsing with deionized water. The water samples were placed in a cooler at 4 Degrees Celsius and sent under chain of custody via overnight courier to the analytical laboratory. The samples were placed in sample containers appropriate for the requested analyses.

Duplicate samples were collected from four wells, and an equipment blank was collected from a decontaminated stainless steel bailer. In addition, three trip blanks consisting of laboratory-prepared water samples were shipped in the same sample coolers along with the well samples to the analytical laboratory.

3.2 Analytical Program

All samples were analyzed by Data Chem Laboratory, Salt Lake City, Utah, for volatile organic compounds (VOCs) using EPA Test Method 8010. Five samples were also analyzed for general mineral and inorganic chemical constituents using various EPA methods. The following general minerals were analyzed using EPA Test Method 6010: Aluminum, calcium, copper, iron, magnesium, manganese, potassium, sodium, and zinc. Total dissolved solids were analyzed using EPA Test Method 160.1. The samples were analyzed for alkalinity, carbonate, bicarbonate, and hydroxide using EPA Test Method 403. EPA Test Method 300 was used to analyze the samples for chloride and sulfate. Total nitrates were analyzed using EPA Test Method 353.2. General chemistry analytes included hardness (Method 2340), conductivity (Method 120.1), pH (Method 150.1), and MBAS (Method 425.1).

4.0 RESULTS AND DISCUSSION

4.1 Groundwater Analysis

Perc was detected in 11 of the 28 well samples in concentrations ranging from 1.6 to 750 micrograms per liter ($\mu\text{g/l}$). Samples from five of the wells contained Perc concentrations greater than the EPA's MCL of 5 $\mu\text{g/l}$. These wells were generally toward the center of the PAA. Six samples contained Perc concentrations above the detection limit but below the MCL. Bromodichloromethane, dibromochloromethane, and bromoform were detected in one sample at concentrations ranging from 1.3 to 3.5 $\mu\text{g/l}$. No other VOCs were detected.

The inorganic and general chemistry results indicated that the following parameters were within the range of or below the secondary water-quality standard maximum allowable concentrations: pH, foaming agents (MBAS), chloride, iron, manganese, sulfate, Total Dissolved Solids (TDS), and zinc (*Department, 1989*). The general minerals results from the five wells varied little, indicating similar inorganic water quality in all sampled wells. These inorganic results along with future inorganic analyses will be evaluated in the ongoing investigation to assess if any inorganic chemical patterns can be correlated with sample depth or location.

4.2 Quality Assurance/Quality Control

Data validation was performed on field and laboratory quality control (QC) samples using procedures described in the QAPP; the results are discussed below (HLA, 1992a).

4.2.1 Field Quality Control

Field QC samples consisted of three trip blanks, one equipment blank, and four duplicate samples. Table 1 summarizes the quality assurance data for the August 1992 sampling.

The trip blanks were prepared by the analytical laboratory and consisted of organic-free deionized water in laboratory-prepared sample containers; they were not decanted from their original containers. One trip blank was submitted for analysis along with the groundwater samples collected each day. Methylene chloride, a suspected laboratory contaminant, was detected in one trip blank at a concentration of 1.1 $\mu\text{g/l}$. It was not detected in any of the groundwater samples.

Equipment blanks consisted of organic-free deionized water that was rinsed through decontaminated field sampling equipment and then poured into sample containers under field conditions. One equipment blank was collected during sampling; chloroform was detected 2.8 $\mu\text{g/l}$. It was not detected in any of the groundwater samples.

Duplicate samples were collected from four wells and analyzed using EPA Test Method 8010 to evaluate laboratory precision. Relative percent differences (RPDs) were calculated for parameters detected above the reporting limits in the duplicate samples; RPDs were calculated for two sets of data. The two RPDs for Perc (6 and 7 percent) were well below the quality assurance goal of less than 100 percent defined in the QAPP (HLA, 1992a).

All of the samples were prepared for VOC analysis within the method-specified 14-day holding time. Instrument calibration was also performed on the 14th day. However actual sample analysis for 13 of the 36 VOC analyses slightly exceeded the 14-day holding time (Table 1).

4.2.2 Laboratory Quality Control

Laboratory QC data included matrix spike, matrix spike duplicate, and blank spike recoveries. The results are discussed below.

4.2.2.1 Matrix Spike

A matrix spike was used to evaluate the accuracy of the laboratory analysis. A known amount of a chemical was added to the sample or a known blank and accuracy was assessed by the percentage of the spike recovered. The criterion established in the QAPP for acceptable accuracy for water samples was 60 to 150 percent. The matrix spike results are listed in Table 1. All eight were within the acceptable criterion.

4.2.2.2 Matrix Spike Duplicate

A matrix spike duplicate was used to evaluate the precision of the laboratory analysis, calculated as in Section 4.3.1. The acceptable RPD for a laboratory water sample is less than 20 percent. All of the eight matrix spike duplicates met this criterion.

4.2.2.3 Blank Recoveries

A blank spike was prepared in the laboratory by adding a known amount of target analyte(s) to a field sample before preparing the sample for analysis to simulate the matrix effect. All blank spike recovery analyses met the QAPP criterion.

4.2.3 Overall Completeness

The overall completeness value is a comparison of the number of data that meet QAPP accuracy and precision criteria and the number of data expected to meet these criteria under normal conditions. The overall completeness for the August 1992 sampling round was 91.8 percent (Table 1).

4.3 Well Owner Data

The individual results of the sample analyses have been provided under separate cover to each of the respective well owners.

5.0 RESAMPLING PLAN

The initial sampling results indicated that 6 of the 28 wells contained Perc above the analytical detection limit but below the EPA's MCL of 5 $\mu\text{g/l}$. These wells will be resampled on a quarterly basis to verify and monitor these Perc concentrations.

Sampling will be performed as described in this report and in accordance with the QAPP (HLA, 1992a).

6.0 SUPPLEMENTAL SAMPLING PLAN

To further define the Affected Area in the vicinity of Maple Grove Road, an additional five wells will be sampled. Sampling will be performed in accordance with the QAPP (HLA, 1992a). To further define the Affected Area in the vicinity of Milwaukee Street and Benjamin Lane, the most recent data from monitoring wells sampled by Special Resource Management, Inc. (SRM), Boise, Idaho, will be evaluated. If the SRM data indicate that the Affected Area needs further definition in the eastern portion of the PAA, a subsequent Supplemental Sampling Plan for additional survey work and sampling will be submitted. Because Perc concentrations were below the MCL in wells on or near the northern and western PAA boundaries, no additional sampling in those areas is proposed at this time. An additional Supplemental Sampling Plan will be submitted in the future if conditions change dependent on the ongoing quarterly sampling proposed in the Resampling Plan.

7.0 REFERENCES

Harding Lawson Associates (HLA), 1991. *Site Safety Plan, VW&R Boise, Boise, Idaho.* August 20.

_____, 1992a. *Quality Assurance Project Plan. Former VW&R Facility, Boise, Idaho.*

_____, 1992b. *Work Plan, Boise Towne Square Mall Supplemented Investigation and Final Remediation, Boise, Idaho.* June 18.

_____, 1992c. *Initial Sampling Plan, Preliminary Affected Area, Water Supply Order, Boise, Idaho.* August 3.

Idaho Department of Health and Welfare (Department), 1989. *Idaho Groundwater Quality Protection, A Manual for Local Officials.* January.

Van Waters & Rogers Inc. (VW&R), 1992. *West Boise Well Survey Summary Report.* June 9.

ILLUSTRATIONS

DISTRIBUTION

INITIAL SAMPLING REPORT
PRELIMINARY AFFECTED AREA
WATER SUPPLY ORDER
BOISE, IDAHO
November 17, 1992

Copy No. ____

Copy No.

1 copy:	Van Waters & Rogers Inc. 6100 Carillon Point Kirkland, Washington 98033 Attention: Mr. Wayne Grotheer	1
1 copy:	Van Waters & Rogers Inc. 50 South 45th Avenue Phoenix, Arizona 85043-3907 Attention: Ms. Gail Clement	2
3 copies:	Preston Thorgrimson Shidler Gates & Ellis Attorneys at Law 5400 Columbia Center 701 Fifth Avenue Seattle, Washington 98104-7078 Attention: Mr. Scott Vokey	3-5
6 copies:	Idaho Department of Health and Welfare Division of Environmental Quality 1410 North Hilton Boise, Idaho 83706-1253 Attention: Ron Lane	6-11
5 copies	Harding Lawson Associates	12-16

SMW/CRS/CAA/mm/D26866-H

QUALITY CONTROL REVIEWER



Mark B. Hersh
Associate Hydrogeologist